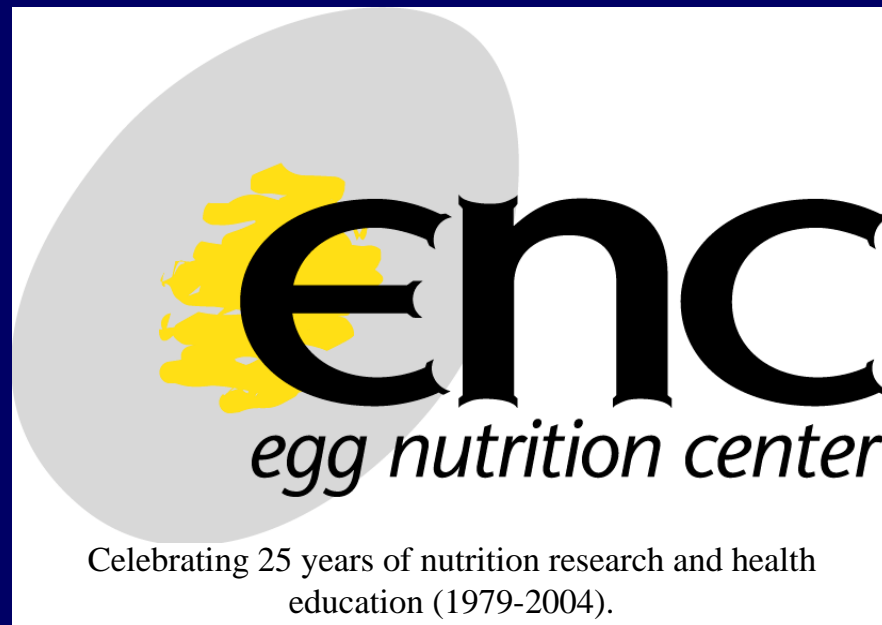


BEING POSITIVE ABOUT EGGS

Donald J. McNamara, Ph.D.

Egg Nutrition Center

Washington, DC



A Guide TO GOOD EATING

MILK
 2 OR MORE GLASSES DAILY . . . FOR ADULTS
 3 - 4 OR MORE GLASSES DAILY . . . FOR CHILDREN
*To drink, combined with other foods,
 in ice cream and in cheese*

VEGETABLES
 2 OR MORE SERVINGS DAILY OTHER THAN
 POTATO . . . 1 green or yellow; "greens" often

FRUITS
 2 OR MORE SERVINGS DAILY
At least 1 raw; citrus fruit or tomato daily

EGGS
 3 TO 5 A WEEK; 1 DAILY PREFERRED

MEAT, CHEESE, FISH, POULTRY
 1 OR MORE SERVINGS DAILY
Dried beans, peas, peanuts occasionally

CEREAL AND BREAD
 2 OR MORE SERVINGS DAILY
*Whole-grain value or enriched
 Added milk improves nutritional values*

BUTTER
 2 OR MORE TABLESPOONS DAILY

**OTHER FOODS TO SATISFY
 APPETITE AND COMPLETE
 GROWTH AND ACTIVITY NEEDS**

The nutritional statements made on this chart have been reviewed by the
 Council on Foods and Nutrition of the American Medical Association and
 found consistent with current authoritative medical opinion.

Early dietary recommendation that everyone eat 3-5 eggs a week, daily preferred.



**Your cholesterol numbers
are just too high.**

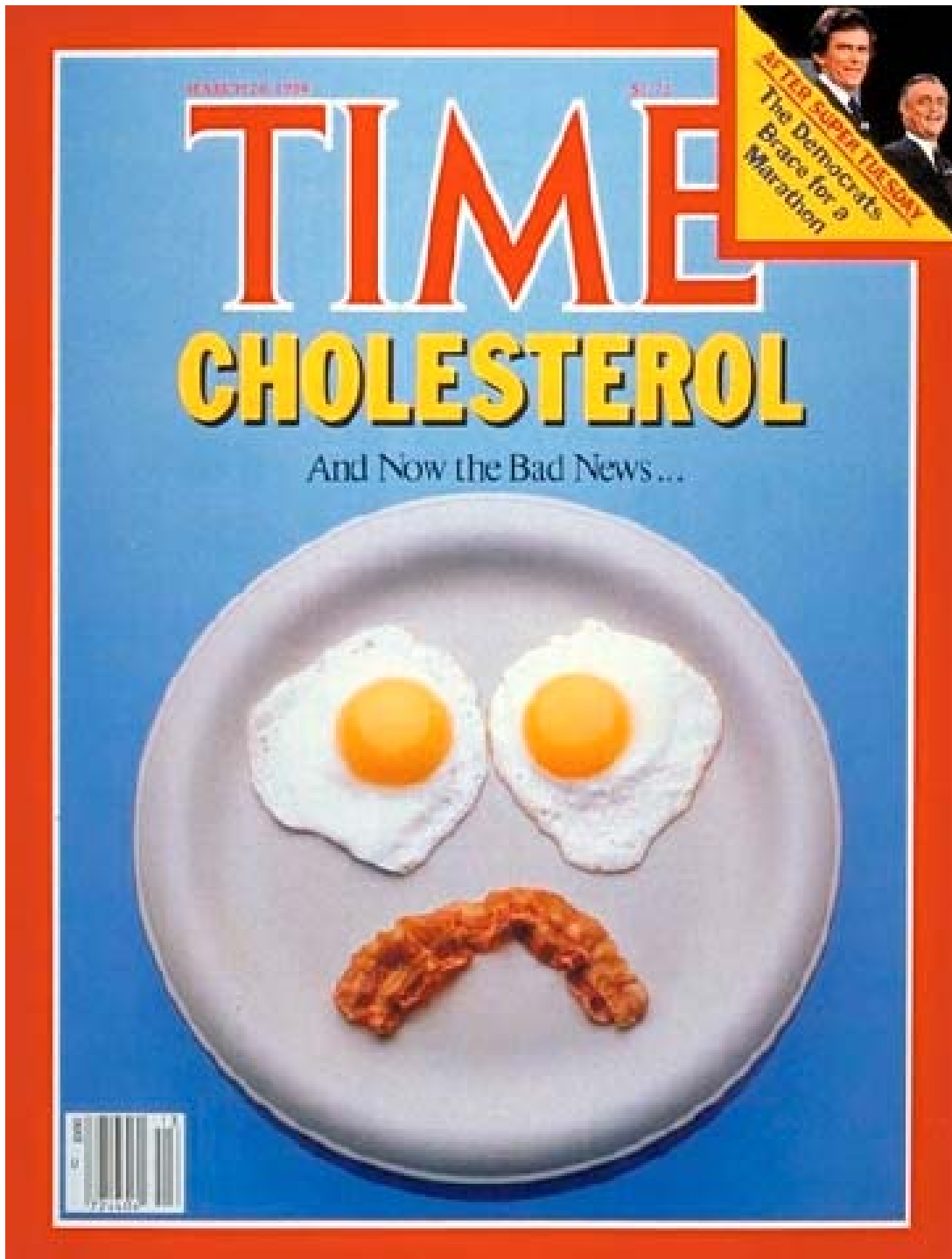


AHA 1968

American Heart Association Dietary Guidelines

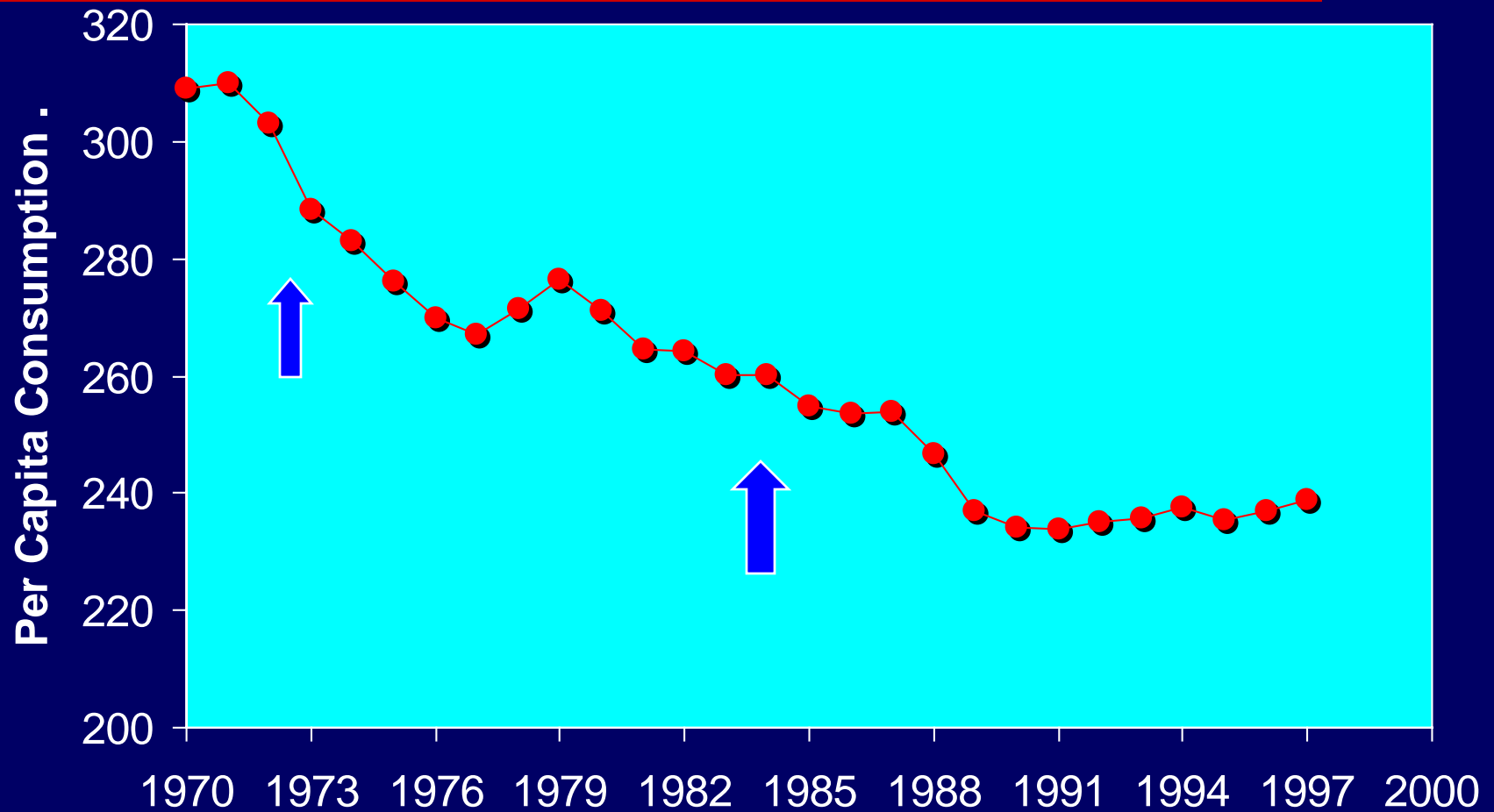
Dietary Cholesterol

The association noted that dietary cholesterol – the cholesterol found in foods like eggs and shrimp – be limited to no more than 300 mg per day, and recommended that individuals eat no more than 3 egg yolks per week.



Eggs became the national icon for dietary excesses and associated high plasma cholesterol levels and CHD risk.

PER CAPITA EGG CONSUMPTION



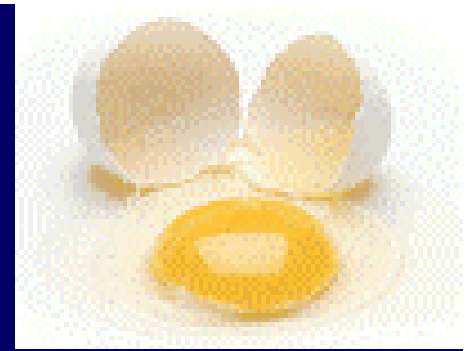
EGG NUTRITION CENTER

- ❑ Founded by United Egg Producers (UEP) in 1979 and funded by the American Egg Board (AEB) in 1984 as part of its commodity research and promotion mandate.
- ❑ Managed by the UEP.
- ❑ Subject to USDA-AMS oversight.
- ❑ Serves as a resource on nutrition and food safety for both production and consumption sectors of the industry.

ENC STAFF

- Donald J. McNamara, PhD
- Hilary E. Shallo, PhD, RD
- Marcia Greenblum, MS, RD
- Jenny Heap, MS, RD
- Phyllis Ford

ENC ACTIVITIES

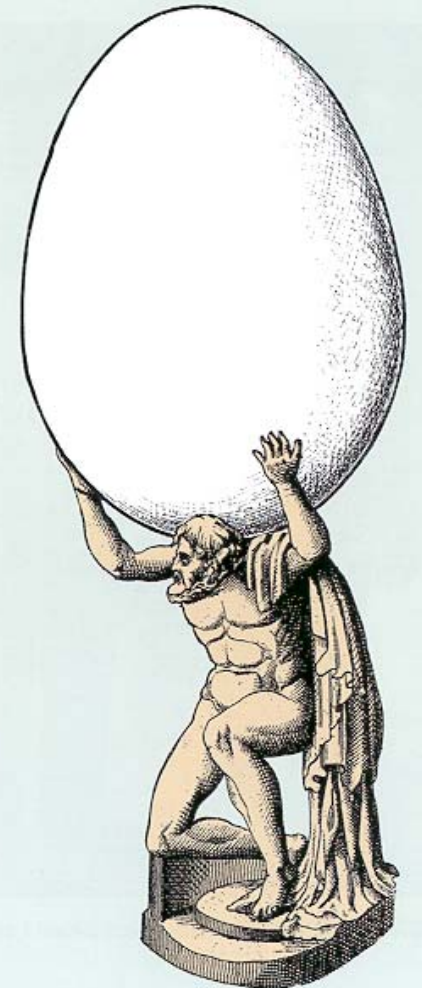


- ❑ Research Monitoring
- ❑ Research Program: AEB
Research Grant and Fellowship Programs
- ❑ Information Dissemination
(primarily health professionals)
- ❑ Information resource for all
stake holders

DIETARY RECOMMENDATIONS

"One of the problems is that strong recommendations have often been made on very weak data. It may have been the best guess at the moment, but often the recommendations are repeated so many times that people forget they were rough guesses in the first place and come to think they are hard facts."

*Dr. Walter Willett, 2000
Harvard School of Public Health*



EPIDEMIOLOGICAL STUDIES

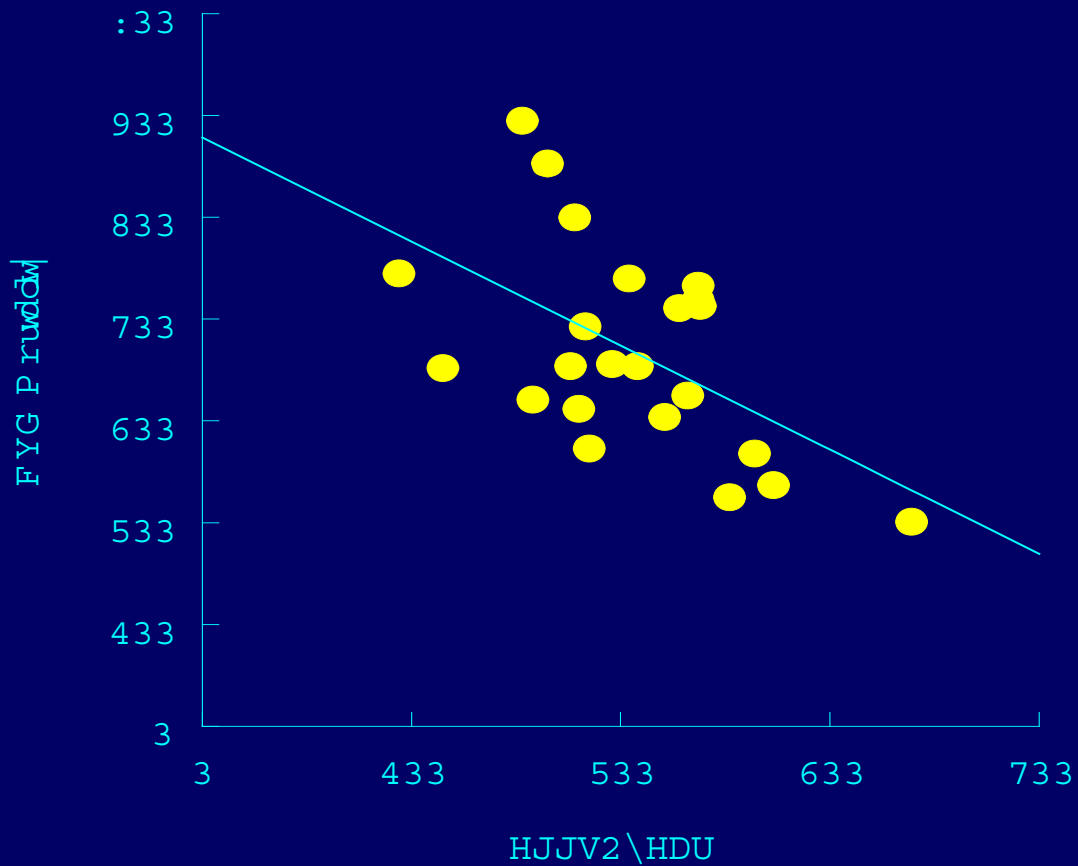
MAJOR TRIALS:

- ❑ Health Professionals Follow-up [n>43,000]
- ❑ Nurses' Health Study [n=80,082]
- ❑ ATBC Cancer Prevention Study [n=21,930 men]

Conclusion:

dietary cholesterol unrelated to CHD

EGGS & CVD



EGGS & CVD

Health Professionals Follow-Up Study

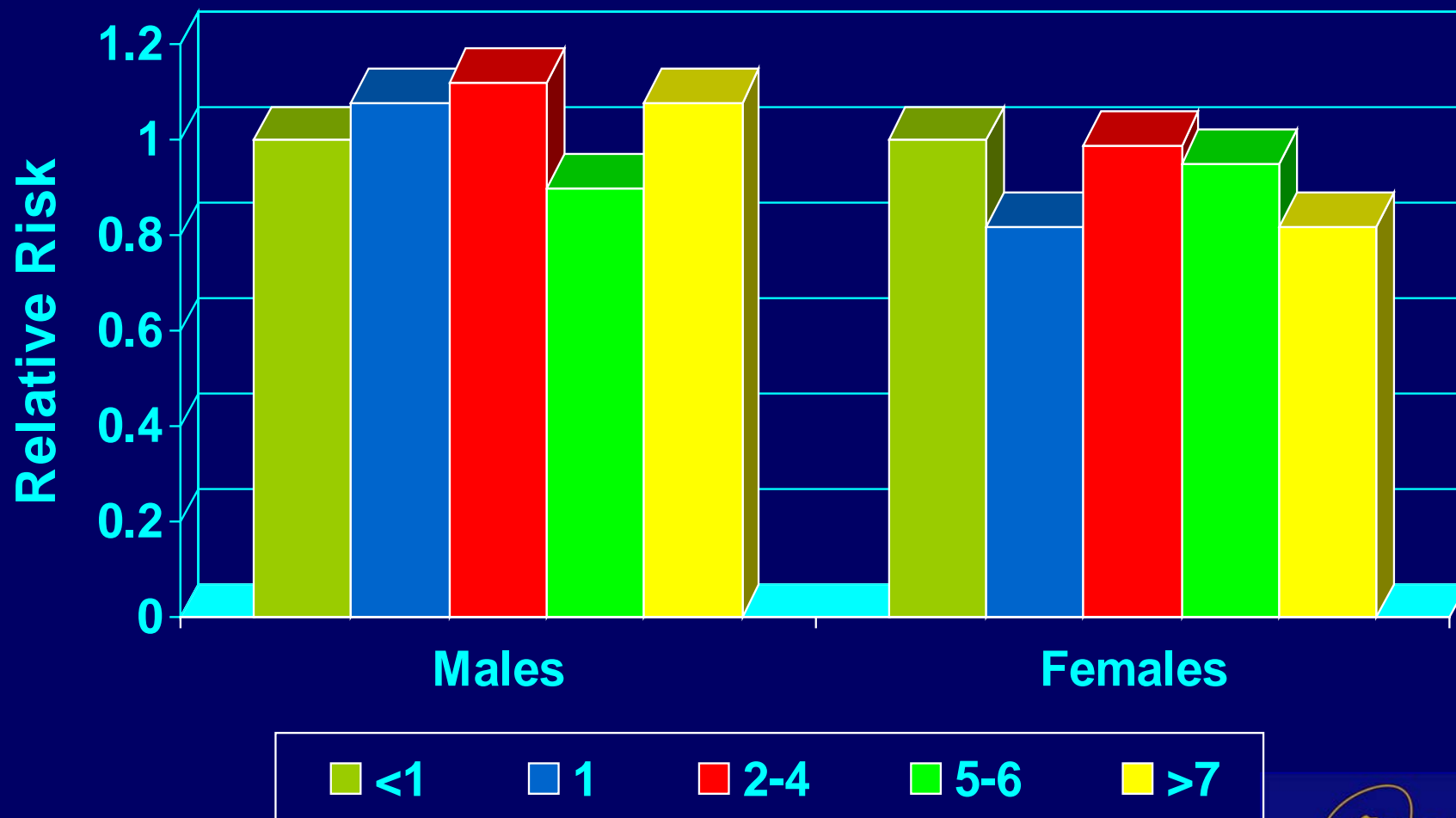
37,851 men followed for 8 years, 866 cases of CHD

Nurses' Health Study

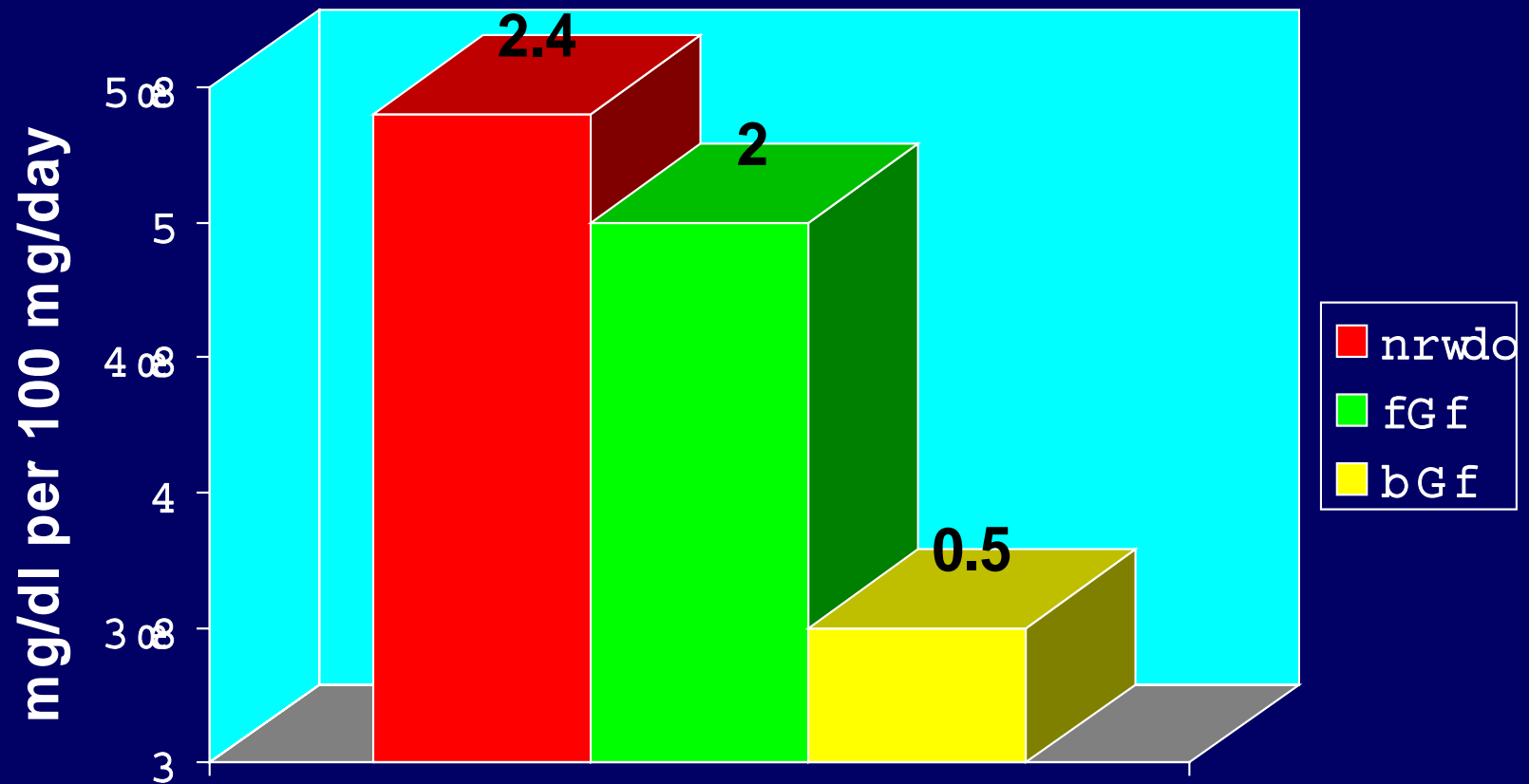
80,082 women followed for 14 years, 939 cases of CHD

What is the relationship between weekly egg consumption and CHD risk?

EGGS / WK & CHD RISK



DIETARY CHOLESTEROL



GOOD-BAD CHOLESTEROL

	<u>300</u> <u>mg/day</u>	<u>500</u> <u>mg/day</u>
Total-C	200	205
LDL-C	130	134
HDL-C	50	51
LDL:HDL	2.6	2.6

RETURN OF THE GOOD EGG

Promotion emphasis shift from negative cholesterol issue to positive nutritional messages.

Tell the good news about eggs.



Dozens of Reasons to Eat Eggs: A Lifetime of Health Benefits



FORGOTTEN POSITIVES

- ❑ High quality protein
- ❑ Vitamins -minerals
- ❑ Carotenoids
- ❑ Choline
- ❑ Satiety, glycemic index
- ❑ Affordability
- ❑ Convenience



NUTRIENT DENSE EGGS

Two Large Eggs = 155 calories

6% food energy

20% protein

53% essential aa

30% riboflavin

12% vitamin A

16% vitamin B₁₂

12% folate

12% vitamin D

16% phosphorous

8% vitamin B₆

34% selenium

8% iron

8% zinc

6% vitamin E

FETAL ORIGINS HYPOTHESIS

Low birth weight
associated with chronic
diseases later in life
["Barker Hypothesis"]

Low maternal intakes of
dairy and meat protein in
late pregnancy
associated with lower
birth weights

[Godfrey et al. 1996 BMJ 312, 410-4]



EGGS & WEIGHT CONTROL

- ❑ Low calorie, nutrient dense.
- ❑ Satiety, glycemic effects.
- ❑ High protein diets and loss of fat vs muscle.
- ❑ What role for eggs in weight loss and in weight maintenance programs?



EGGS & SATIETY

	Egg Breakfast (17)	Bagel Breakfast (17)	% Change	P Value
Satiety at 3 hr (1-6)	4.5 ± 1.3	2.4 ± 0.6	+ 88%	<0.00001
Lunch intake (kcal)	560 ± 142	704 ± 110	- 21%	<0.0002

Decrease of 430 kcal intake 24 hrs.

DIETARY PROTEIN QUALITY

In elderly women, a high vegetable-protein diet resulted in less net protein synthesis than during a high animal-protein diet. [Pannemans et al. 1998. *Am J Clin Nutr*: 68:1228-35]

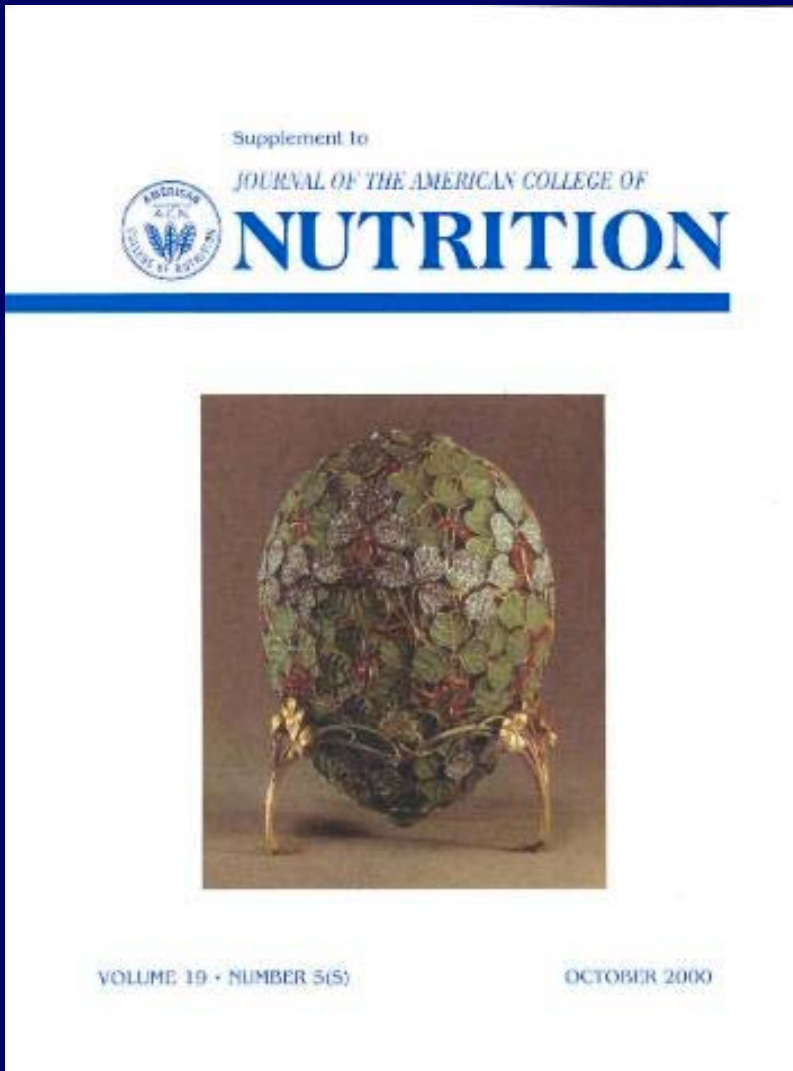
Consumption of a meat-containing diet contributed to greater gains in fat-free mass and skeletal muscle mass with resistance training in older men than did a vegetarian diet. [Campbell et al. 1999. *Am J Clin Nutr*: 70:1032-9]

AFFORDABILITY

Cost of 20 grams of protein:

eggs	\$0.25
pork shoulder	\$0.40
ground beef	\$0.42
chicken breast	\$0.50
frankfurter	\$0.94
pork chop	\$1.09
rib roast	\$1.43

J Am Coll Nutr Suppl 2000



Where would we be without the egg? A conference about nature's original functional food.

FUNCTIONAL EGGS

- ❑ High choline content
- ❑ Increase Lutein – zeaxanthin
- ❑ Add omega-3 fatty acid
- ❑ Conjugated linolenic acid [CLA]
- ❑ Increase Vitamins E, D and K
- ❑ Increase B Vitamins
- ❑ Satiety, glycemic index

WHAT IS CHOLINE?

- ❑ Egg lecithin (phosphatidylcholine) is made up of glycerol, fatty acids, phosphate and choline.
- ❑ Choline is important in nerve cell transmission, source of acetylcholine.
- ❑ Plays important roles in brain development, memory and Alzheimer's disease.

CHOLINE & DEVELOPMENT

- ❑ Pregnancy: large amounts of choline delivered to fetus and newborns have high plasma choline levels (7-fold).
- ❑ Lactation: high choline content in breast milk

CHOLINE & THE BRAIN

- ❑ Studies in rodents suggest that dietary intake of choline early in life can diminish the severity of memory deficits in aged animals.
- ❑ Critical periods for choline enhancement of memory
 - Embryonic (12-17 d)
 - Postnatal (16-30 d)

CHOLINE: ESSENTIAL NUTRIENT

- ❑ A large egg has 180 mg choline
- ❑ Choline is concentrated in the yolk
- ❑ Choline AI is 550 mg/day for males and 425 mg/day for females
- ❑ Increased intake recommended during pregnancy and lactation
- ❑ 2 eggs provide almost 80% of AI value

EGGS & CAROTENOIDS

Studies indicate that dietary lutein and zeaxanthin help preserve the health of the aging eye against macular degeneration and cataracts.

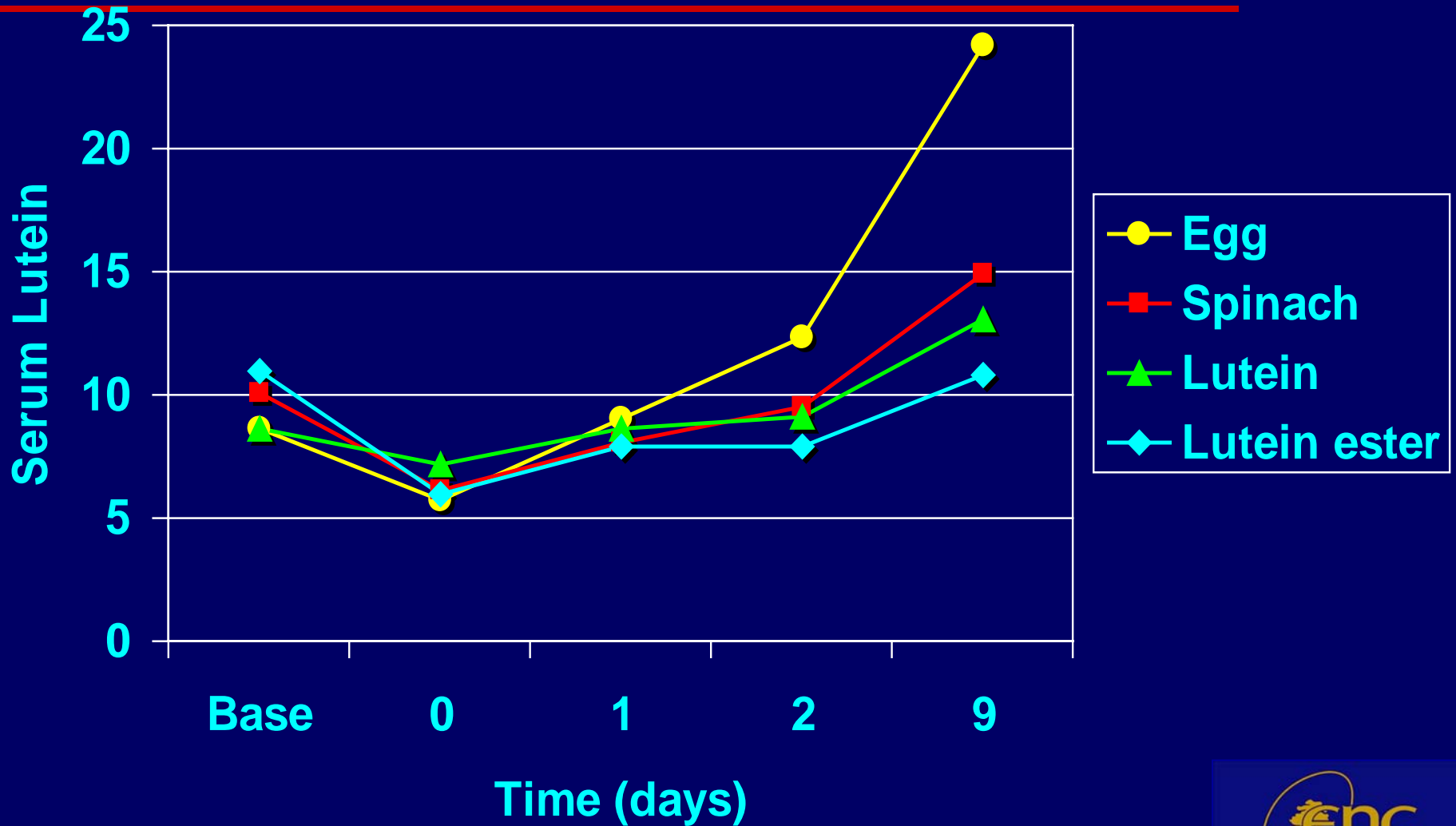
Addition of 1.3 egg yolks per day to the diets of 11 middle-aged subjects:

- increased plasma lutein [38%]
- increased plasma zeaxanthin [128%]

Handelman et al. 1999. Am J Clin Nutr 70:247-251.



LUTEIN BIOAVAILABILITY



EGGS AND MPOD

	Controls (8)	6 Eggs/wk for 3 months (9)
Baseline MPOD	0.173	0.181
Final MPOD	0.195	0.300*

While the average level of lutein and zeaxanthin in one egg is modest (L=250 μ g and Z=200 μ g, for the eggs used in these studies) the bioavailability appears high. Consuming 6 eggs/week resulted in a significant increase in MPOD without increasing cholesterol risk.

EGGS AND CATARACTS

- ❑ Data from the Beaver Dam Eye Study indicated that egg consumption was inversely associated with cataract risk in participants who were younger than 65 when the study started.
- ❑ The relative risk of cataracts was 0.4 for people with the highest egg consumption versus a risk of 1.0 for those with the lowest intake.

LUTEIN & CHD

- ❑ Lutein inhibited the inflammatory response of monocytes to LDL trapped in the artery wall in vitro.
- ❑ Lutein supplementation reduced the size of atherosclerotic lesions in apoE knockout mice.
- ❑ Carotid artery thickness was unchanged in the highest quintile of plasma lutein and increased in the lowest quintile.

[Dwyer et al. 2001. Circulation 103:2922-2927.]

EVEN MORE REASONS

- ❑ Feeding egg yolks at 6 months of age provides valuable source of iron for infant.
- ❑ Teenage girls who regularly eat eggs are less likely to develop breast cancer later in life.
- ❑ Egg intake related to a reduced risk of stroke.

EGG INDUSTRY ISSUES

- ❑ Cholesterol (Attitude adjustment)
- ❑ Salmonella & other food safety issues (SQF)
- ❑ Animal Welfare (ACC)
- ❑ Environmental issues (Research)

RESEARCH PROJECTS

- ❑ Nutrition Research
 - ❖ Cholesterol
 - ❖ Functional Food
- ❑ Food Safety Research
- ❑ Pre-Doctoral Fellowship



AEB/ENC RESEARCH PROGRAM

Dietary Cholesterol

LDL:HDL ratio

Hyper-responders

Genetics

Hypercholesterolemia

Food Safety

Vaccines

Molting

Cooking

Nutritional Value

Protein quality

Choline

Lutein/zeaxanthin

Satiety & weight loss

Population databases

High protein diets

EGGS COME FULL CIRCLE

—070450—050



V a l u e

2002: A CHANGE OF HEART

SEARCH

DONATE HELP CONTACT SITE INDEX HOME

May 6, 2002

American Heart Association®
Fighting Heart Disease and Stroke

Eggs

AHA Scientific Position

Eggs are rich in protein, B vitamins, iron, and other minerals. All of these are essential for good health. But egg yolks are also rich in dietary cholesterol, which contributes to elevated blood cholesterol levels. High blood cholesterol is a major risk factor for coronary heart disease, which leads to heart attack.

AHA Recommendation

We recommend that healthy American adults limit cholesterol intake to less than 300 milligrams (mg) per day. One large whole egg contains 220 mg of cholesterol. This is 71 percent of the daily recommended amount. **If you consume an egg daily, it's important to limit dietary cholesterol from other sources, such as meats, poultry, and dairy products.** The key is not to focus on any one cholesterol-containing food.

Our dietary guidelines, revised in 2000, emphasize an overall dietary pattern for good health. **There is no longer a specific recommendation on the number of egg yolks a person may consume per week.**

A simple way to work a single egg into a day's menu would be to make one of your meals vegetarian, without cheese (also a source of dietary cholesterol) and avoid baked goods (like muffins, cookies and cakes) that often have eggs as a major ingredient. If you have a meat-based meal that day, make sure your serving of meat is no bigger than a deck of cards, and preferably lean. In addition, many cholesterol-free egg substitutes and recipes with yolk-free alternatives are available. In the past, we recommended limiting the number of egg yolks consumed weekly to a specific number. We made this recommendation as a way to help people limit cholesterol in their diet to less than 300 milligrams daily.

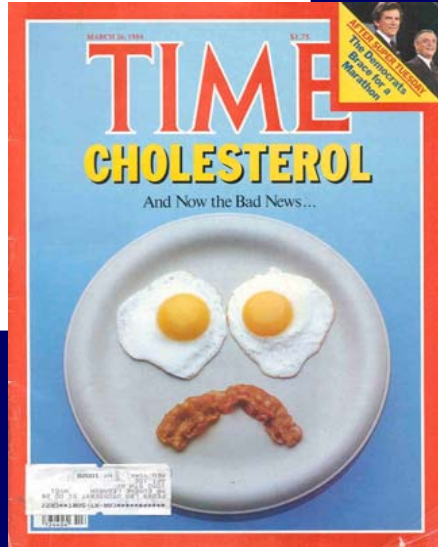
DID YOU KNOW?
Nearly one third of all Americans with high blood pressure don't even know they have it.
[read more...](#)

There is no longer a specific recommendation on the number of egg yolks a person may consume per week.

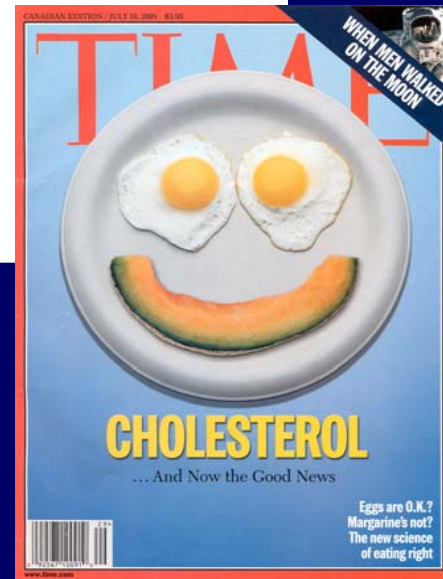


DEATH OF AN ICON (PLEASE)

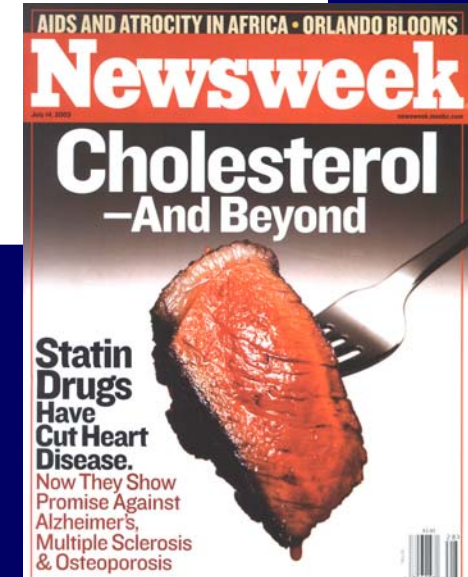
1984



1999



2003



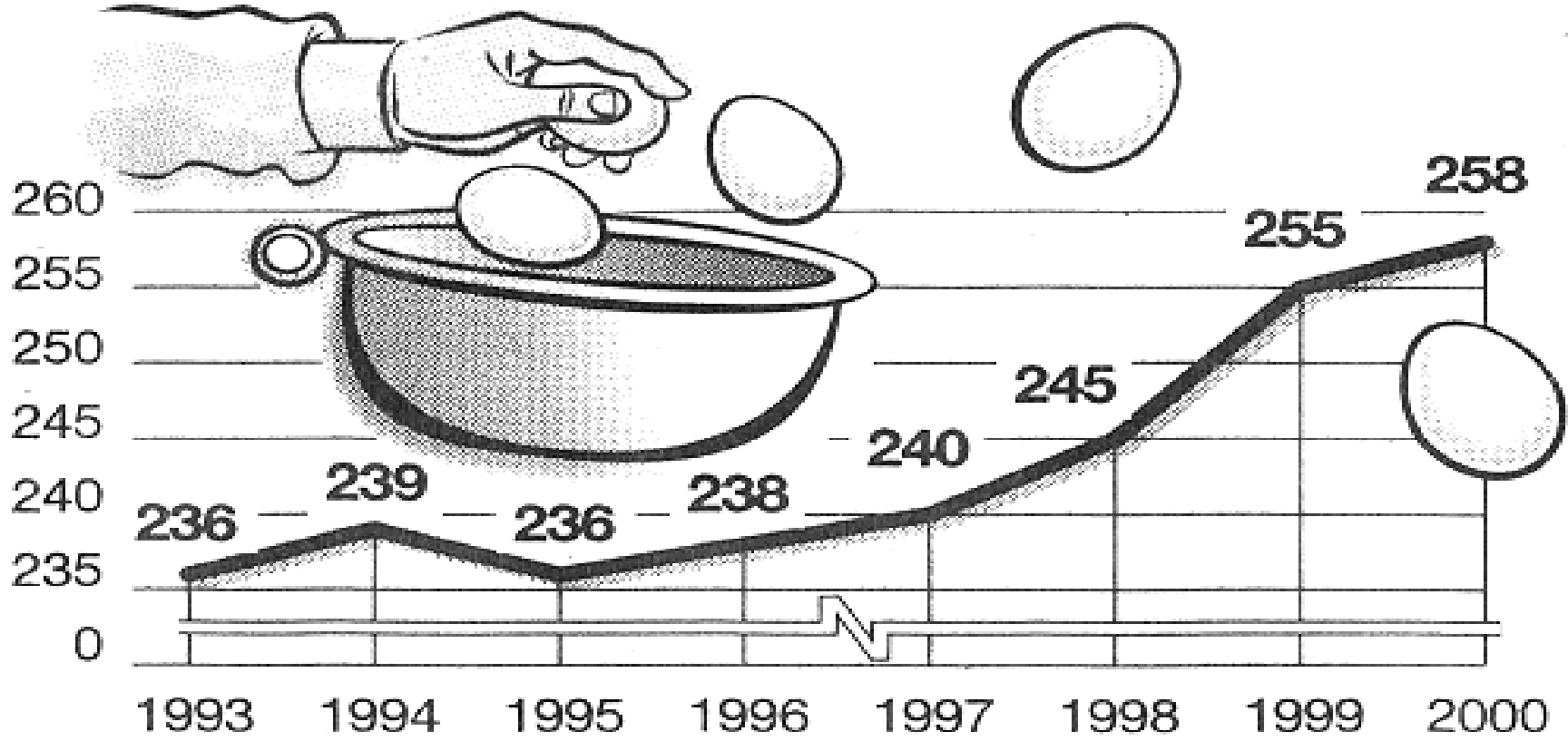
Eggs are no longer the icon for cholesterol!

USA SNAPSHOTS®

A look at statistics that shape the nation

Egg consumption rising

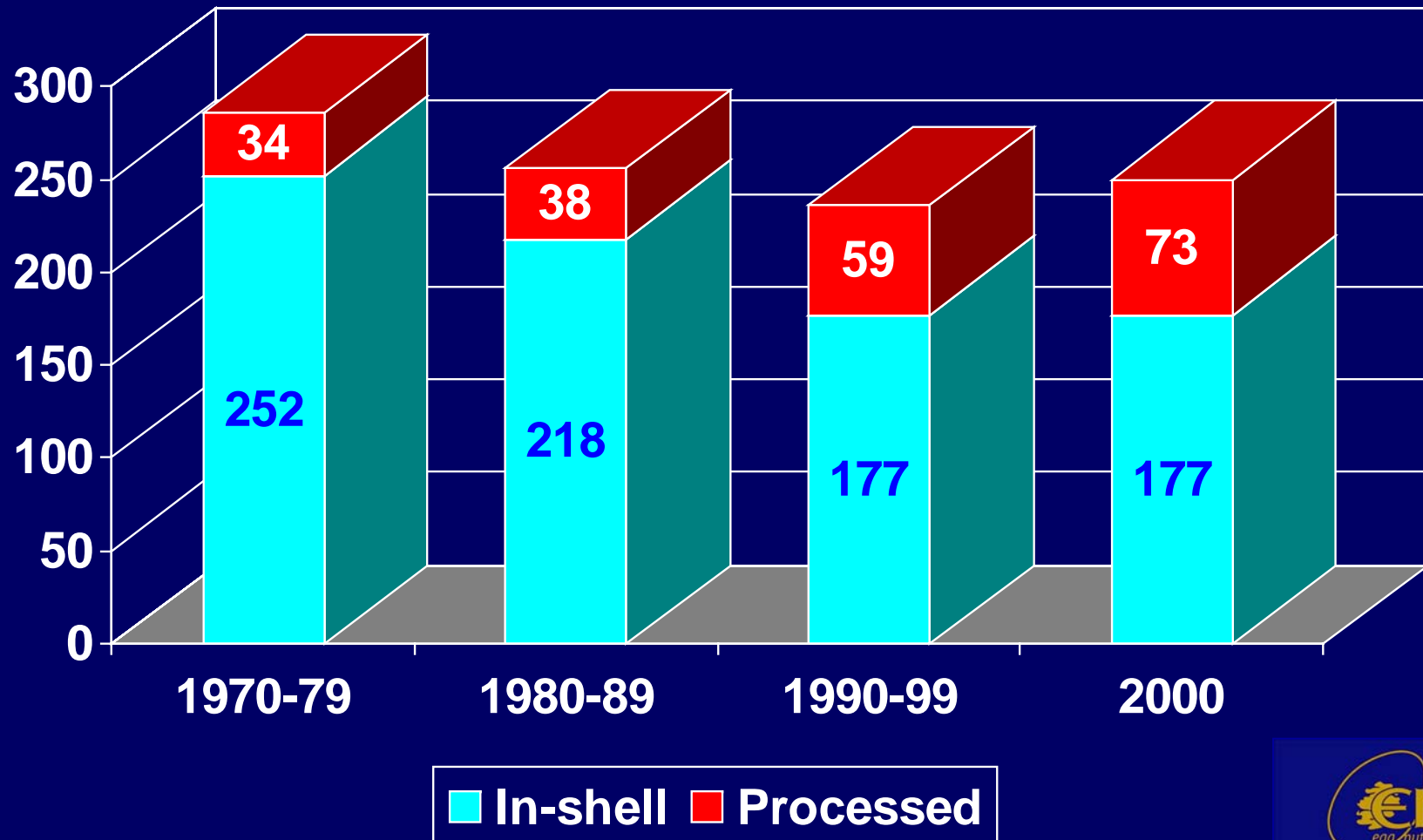
Americans will eat an average of 258 eggs each this year, the Agriculture Department says. Annual egg consumption:



Source: USDA Economic Research Service

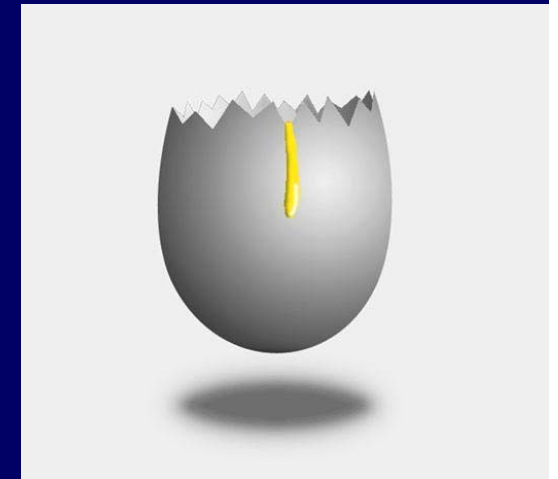
By Hilary Wasson and Bob Laird, USA TODAY

Per Capita Egg Consumption

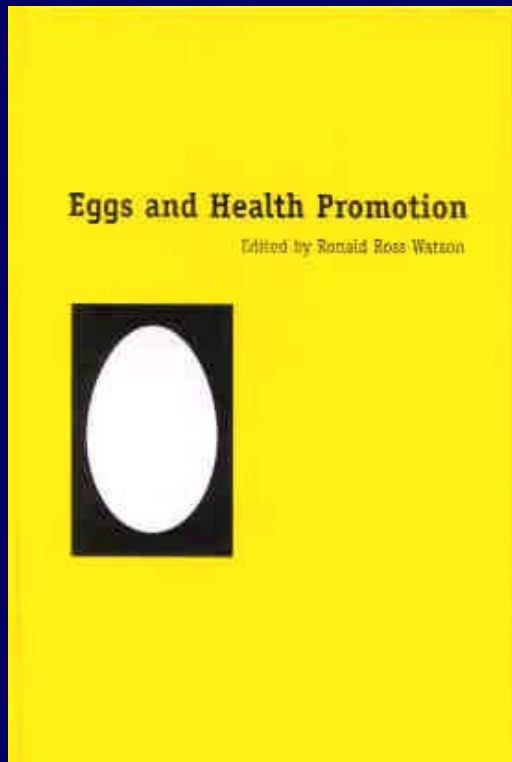


EGG PRODUCTS

- ❑ *Options:* increase nutrients by feeding the bird (low incorporation) or adding directly to the egg product (100%).
- ❑ Ideal matrix for fat soluble nutrients providing increased bioavailability.
- ❑ *Potential:* vitamins E, D, & K; lecithin, lutein, isoflavones, CLA, etc.



Eggs and Health Promotion



Iowa State Press
March 2002

Dispelling misconceptions and covering significant recent advances in egg use, this book provides up-to-date research on the role of eggs in the context of a healthful diet.

This single, convenient reference focuses on current scientific data covering: the influence of eggs on health and disease risk factors; the emergence of modified eggs; and the use of eggs to directly prevent or treat diseases.

American Council on Science and Health

The Role of Eggs in the Diet: Update

*What's the Story?
Eggs*



J Am Coll Nutr Suppl 2004

Supplement to



JOURNAL OF THE AMERICAN COLLEGE OF
NUTRITION



VOLUME 23 • NUMBER 6(S)

DECEMBER 2004

First International
Scientific
Symposium on
Eggs and Human
Health: The
Transition from
Restrictions to
Recommendations



AND WHAT ABOUT PETS?

- ❑ Purina Puppy Chow now advertises that it contains egg protein.
- ❑ 135 million pets in the US.
- ❑ Eggs considered a healthy, positive food for dogs and cats.
- ❑ One egg a day at less than \$0.10/day for the owner equals 49.275 billion eggs (4.1 B dozen, 137 M cases) and \$4.9 billion in sales.



A LIFETIME OF HEALTH BENEFITS



EGGS 2005: NUTRITION /FUNCTION / VALUE

A Dozen Reasons To Eat Eggs!

